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In it the principles established in the preceding parts were applied to ascertain the exact power of each of the letters of the Egyptian alphabet. Those contained in the alphabet lately published by Chev. Bunsen were first examined; and then the other characters alleged to be alphabetic: some of which were classed, in Chev. Bunsen's arrangement, among the syllabic signs, while others were altogether omitted. A new class of letters having the power of *ch*, and corresponding to the Hebrew **ש**, is established, to which the *long serpent* belongs, occurring in the word *chat*, signifying *ever*.

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Robert Ball, Esq., exhibited various anatomical preparations of marine animals made by Mr. Goadby of London.

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June 22.

REV. HUMPHREY LLOYD, D. D., President, in the Chair.

Mr. Oldham, on the part of Mr. R. Mallet, who was unavoidably absent, described the objects, construction, and use of certain new instruments devised by the latter for self-registration of the passage of earthquake shocks.

Instruments previously intended for this purpose have not possessed the power of self-registration; they have consisted either in the trace left by the motion of a viscid fluid on the containing vessel, or they have been upon the principle of the inverted pendulum, or watchmaker's noddly. Instruments so constructed are objectionable, because having themselves times of vibration of their own, which may conflict with those of the earthquake shock, they are liable to fail in point of delicacy. They also possess several inconveniences of a mechanical kind in being adapted to self-registration.

The objects to be attained in the instruments which the author has had in view, are :

The self-registration—

1st. Of the time of transit, at a given point of the earth's surface, of an earthquake shock, or earth-wave, noting same to a small decimal of a second of time.

2nd. Of the vertical element, or altitude, of the earth-wave, at the moment of its transit, whether the wave be a positive or a negative one.

3rd. Of the horizontal element, or amplitude of the wave, at the same moment.

4th. Of the direction, as to azimuth, of the wave transit.

The principle adopted, as the means by which the wave, or shock, shall act upon the instrument, consists in availing ourselves of the oscillation of a column of mercury, in two vertical, and in four horizontal glass tubes, of peculiar construction. One end of the column of mercury in each tube is so adjusted in contact with one pole of a constant galvanic battery, that the oscillation produced in the mercurial column by the wave, in passing, breaks contact. The time during which the contact remains broken is proportionate to the amount of the vertical and horizontal elements of the wave. The breach of contact releases one or more of six pencils at the instant of its occurrence, and until contact is restored. Either of these continues to describe a trace upon a ruled sheet, placed upon a cylindrical barrel, carried round by the astronomical clock. The length of this trace is, therefore, a graphic representation of the amount of the respective element of the wave, and the pencil which marks it indicates the direction of the oscillation, whether vertically positive or negative, or horizontally from any point of the compass.

A somewhat similar arrangement marks, upon four dials, the hour, minute, second, and fraction of a second, at which the crest of the wave has passed the point of the observatory, or locus of the instrument. This is of peculiar importance for ascertaining the rate of progress of the wave between two distant observatories. The instrument cannot

be understood in its details, without the aid of diagrams, as exhibited to the Academy.

The instrument is designed to register, by itself, for twelve hours at a time, and at such an interval its registrations require to be read off and noted.

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Dr. Todd read a letter from C. T. Barnwell, Esq., containing some observations on two passages of Archimedes, *De Sphæra et Cyindro*, where commentators appear to have been strangely misled.

The first occurs in the Demonstration of Proposition I. of the first book.

In the demonstration of this proposition it is assumed that the triangles  $AB\Delta$ ,  $B\Gamma\Delta$  are together greater than the triangle  $A\Delta\Gamma$  (fig. pag. 79, Oxf. ed. fol. 1792).

Dr. Barrow (in whose edition this is Prop. XII.) says, "liquet . . . quia  $AB + B\Gamma > A\Gamma$ , et altitudo communis est," which is evidently not true, unless the triangle  $AB\Gamma$  were equilateral.

In the German edition of J. C. Sturm (where this is Prop. IX.) the following most extraordinary inference is drawn from Euc. I. 24, viz., that, since (fig. in p. 80)  $\Delta Z > \Delta E$ ,  $\Gamma\Delta$  common, and the angle  $\Gamma\Delta Z >$  the angle  $\Gamma\Delta E$ , the triangle  $\Gamma\Delta Z >$  the triangle  $\Gamma\Delta E$ .

In the Oxford edition, the demonstration of Eutocius is condemned as invalid; but the editor, without stating the nature of his objection, contents himself with adding "sed res ipsa satis patet."

Flauti, of Naples (Corso, vol. I.) observes, and rightly, that the line  $\Delta Z$  should have been directed to be drawn in the plane of the triangle  $A\Delta\Gamma$ , and states what he considers to be the objection of the Oxford editor, viz., that the triangle  $\Gamma\Delta Z$  will not include the triangle  $\Gamma\Delta E$  in the case of the angle  $A\Delta B >$  the angle  $A\Delta\Gamma$ , and that it cannot, therefore, be inferred generally, that the first of these triangles  $>$  the second. He then subjoins a different demonstration.